

Kumaun University, Nainital, Uttarakhand

BACHELOR OF COMPUTER APPLICATION

Session 2019-2020

BCA 411: Introduction to Database System

UNIT I

Elements of database system, DBMS and its architecture, advantages of DBMS, data independence, types of database users, role of database administrator.

UNIT II

Brief overview of hierarchical and network model, relation model (Relations, properties of relational model, keys and entity integrity & referential integrity rules), CODD's rules for referential Model. Entity relationship Model: Entity sets, Relationship sets, Design Issue, Mapping constraints, E-R diagram, weak entity sets, specialization & generalization.

UNIT III

Normalization concepts and update anomalies, Functional dependencies, Normal forms (1NF, 2NF, 3NF, BCNF).

UNIT IV

SQL fundamentals - Integrity – Triggers - Security – Advanced SQL features –Embedded SQL– Dynamic SQL- Missing Information– Views – Introduction to Distributed Databases and Client/Server Databases

UNIT V

Centralized system, Client-Server systems (Transaction server, Data server), Parallel system (Speedup & Scale up), Parallel database architecture (Shared memory, Shared Disk, Shared Nothing), Distributed System (Structures, Trade-offs), Backup and Recovery, Security and Privacy.

Recommended Books:

1. Date C J, "An Introduction to Database System", Addison Wesley
2. Navathe E, "Database management systems",
3. Silberschatz & Korth, Database system Concepts, TMH
4. Bipin Desai, An Introduction to Database System, Galgotia Pub

Kumaun University, Nainital, Uttarakhand

BACHELOR OF COMPUTER APPLICATION

Session 2019-2020

BCA 412: Operating System

UNIT I

Introduction: Basics of Operating Systems: Definition – Generations of Operating systems – Types of Operating Systems, OS Service, System Calls, OS structure: Layered, Monolithic, Microkernel Operating Systems – Concept of Virtual Machine.

UNIT II

Process Management: Processes: Definition, Process Relationship, Process states, Process State transitions, Process Control Block, Context switching – Threads – Concept of multithreads.

Process Scheduling: Definition, Scheduling objectives, Types of Schedulers, Scheduling criteria, Scheduling algorithms: Pre-emptive and Non, pre-emptive, FCFS, SJF, RR, Multiprocessor scheduling: Types, Performance evaluation of the scheduling.

UNIT III

Inter-process Communication: Race Conditions, Critical Section, Mutual Exclusion, Peterson's Solution, The Producer Consumer Problem, Semaphores, Classical IPC Problems: Reader's & Writer Problem, Dining Philosopher Problem etc.

Deadlocks: Definition, Deadlock characteristics, Deadlock Prevention, Deadlock Avoidance: banker's algorithm, Deadlock detection and Recovery.

UNIT IV

Memory Management: Basic Memory Management: Definition, Logical and Physical address map, Memory allocation: Contiguous Memory allocation, Fixed and variable partition, Internal and External fragmentation and Compaction, Paging: Principle of operation, Page allocation, Hardware support for paging, Protection and sharing, Disadvantages of paging. Virtual Memory: Basics of Virtual Memory, Hardware and control structures, Locality of reference, Page fault, Working Set, Dirty page/Dirty bit, Demand paging (Concepts only), Page Replacement policies: Optimal (OPT), First in First Out (FIFO), Least Recently used (LRU). Thrashing

UNIT V

File and Input/output Systems: Access Methods, Directory and Disk Structure; File System Mounting, File Sharing, File-System Structure and Implementation; Directory Implementation, Allocation Methods, Free-Space Management, Efficiency and Performance; Recovery, I/O Hardware, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O Requests to Hardware Operations.

Recommended Books:

1. A Silberschatz, P B. Galvin, G. Gagne, Operating Systems Concepts, 8th Edition, John Wiley Publications 2008.
2. A.S. Tanenbaum, Modern Operating Systems, 3rd Edition, Pearson Education 2007.
3. G. Nutt, Operating Systems: A Modern Perspective, 2nd Edition Pearson Education 1997.
4. W. Stallings, Operating Systems, Internals & Design Principles, 5th Edition, Prentice Hall of India.

Kumaun University, Nainital, Uttarakhand

BACHELOR OF COMPUTER APPLICATION

Session 2019-2020

BCA 413: Cloud Computing

UNIT I

Introduction: Cloud-definition, benefits, usage scenarios, History of Cloud Computing, Cloud Architecture, Types of Clouds, Business models around Clouds, Major Players in Cloud Computing, issues in Clouds, Eucalyptus, Nimbus, Open Nebula, Cloud Sim.

UNIT II

Cloud Services: Types of Cloud services, Software as a Service, Platform as a Service, Infrastructure as a Service, Database as a Service, Monitoring as a Service, Communication as services. Service providers- Google, Amazon, Microsoft Azure, IBM, Sales force.

UNIT III

Collaborating Using Cloud Services Email Communication over the Cloud, CRM Management, Project Management, Event Management, Task Management, Calendar, Schedules, Word Processing, Presentation, Spreadsheet, Databases, Desktop, Social Networks and Groupware.

UNIT IV

Virtualization for Cloud Need for Virtualization, Pros and cons of Virtualization, Types of Virtualization, System VM, Process VM, Virtual Machine monitor, Virtual machine properties, Interpretation and binary translation, HLL VM, Hypervisors, Xen, KVM, VMWare, Virtual Box, Hyper-V.

UNIT V

Security, Standards and Applications Security in Clouds: Cloud security challenges, Software as a Service Security, Common Standards: The Open Cloud Consortium, The Distributed management Task Force, Standards for application Developers, Standards for Messaging, Standards for Security, End user access to cloud computing, Mobile Internet devices and the cloud.

Recommended Books:

1. John Rittinghouse & James Ransome, Cloud Computing, Implementation, Management and Strategy, CRC Press, 2010.
2. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Que Publishing, August 2008.
3. James E Smith, Ravi Nair, Virtual Machines, Morgan Kaufmann Publishers, 2006.
4. Cloud Computing: Concepts, Technology & Architecture by Thomas Erl

Kumaun University, Nainital, Uttarakhand

BACHELOR OF COMPUTER APPLICATION

Session 2019-2020

BCA 414: Numerical Analysis and Statistical Techniques

UNIT I

Introduction: Raw material of statistics, ungrouped & grouped frequency distribution. Diagrammatic presentation: Bar diagram, Pie-diagram. Graphical presentation: Histogram, Frequency polygon, Frequency curve, Cumulative frequency curve.

UNIT II

Measures of Central Tendency and Dispersion: Arithmetic Mean, Mode, Median, Geometric Mean, Harmonic Mean, Range, Mean Deviation, Standard Deviation, Skewness and Kurtosis.

UNIT III

Correlation and Regression Analysis: Scatter diagram, Karl Pearson, Spearman and Concurrent deviation methods, Regression Lines, Method of least square.

UNIT IV

Probability & Probability Distribution: Classical, Empirical and axiomatic approach to probability, Addition and multiplicative law of probability, Binomial, Poisson & Normal Distribution

UNIT V

Numerical Methods: Interpolation: Finite difference, Operators Δ , E , Newton Gregory Interpolation for equal intervals, divided difference, Newton's Lagrange's Interpolation for unequal intervals.

Central differences: Gauss Forward, Backward, third formula due to Gauss, Stirling & Bessel's formula.

Numerical Differentiation & integration: Numerical differentiation by Newton Gregory formula, general quadrature formula, Trapezoidal rule, Simpson's $1/3$ rule, Simpson's $3/8$ rule. Euler-Maclaurin's summation formula.

Recommended Books:

1. Fundamental of mathematical statistics Gupta & Kapoor S.Chand
2. Introduction to Numerical Methods S.S.Shastri PHI
3. Rajaraman V., "Computer Oriented Numerical Methods", PHI-2004
4. Gerald & Wheatley, "Applied Numerical Analyses", AW-2003